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Air Pollution Disasters: Liability Issues in Negligence Associated With the Provision of Personal Protective Interventions (Facemasks)

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ABSTRACT

Disasters may impact air quality through the generation of high levels of potentially pathogenic particulate matter (PM), for example, in a volcanic eruption. Depending on the concentrations of particles in the air, their size and composition, and the duration of exposure, high levels of PM can create significant public health issues. It has been argued that air pollution, in and of itself, is a public health crisis. One possible intervention to reduce exposure to high levels of PM during an air pollution disaster (APD) is using facemasks. However, agencies may be reluctant to recommend or distribute facemasks for community use during APDs for a variety of reasons, including concerns about liability. There has been no analysis of these concerns. This paper analyzes whether agencies may have a legal duty of care in negligence to provide warnings about the health risks associated with APDs and/or to recommend facemasks as a protective mechanism for community use to reduce exposure to PM. It is also the first to examine the potential for liability in negligence, when a decision is made to distribute facemasks for community use during an APD and the receiver alleges that they sustained a personal injury and seeks compensation.

Key Words: air pollution disasters, duty of care, duty to warn, facemasks, public health

In 2015, the Southeast Asia “haze” crisis arose when vegetation and peat were burned for land clearance in Sumatra and Indonesian Borneo, leading to 3 months of severe air pollution (smoke), exacerbated by an El Niño climatic event. This event is estimated to have resulted in over 100 000 excess deaths across Indonesia, Malaysia, and Singapore.¹ The destruction of the Twin Towers (World Trade Center “9/11”) in New York in September 2001 also led to severe air pollution in and around the site for some months, from the building collapses, fires and ensuing demolition, with some particulate matter (PM) being highly toxic (eg, nearly 2000 tons of asbestos fibers).²

The World Health Organization (WHO) Director of Public Health has warned that air pollution, in and of itself, is a “public health emergency”³ due to the mounting evidence that common air pollutants can affect both acute and chronic morbidity and mortality across a range of diseases.⁴ In this paper, we focus on air pollution disasters (APDs): singular, although sometimes prolonged, severe events where air pollutant concentrations are above the standards legislated for in that jurisdiction and which require, or should require, the intervention of humanitarian and/or public health agencies, such as the Southeast Asia haze crisis or World Trade Center events.

There are several possible public health interventions to protect communities from exposure to high levels of airborne PM. In the absence of advice to evacuate, or mandatory evacuation orders, the most common advice is to stay indoors with the doors and windows closed as this can, in some circumstances, be effective in minimizing ingress of PM.⁵ However, it may not be appropriate for everyone, given that some people must go outside, particularly during long duration APDs. Others may not have access to well-constructed and enclosed indoor environments, for example, if they are homeless, living in poverty, or living in tropical environments with traditional ventilation mechanisms. Other advice is to change outdoor routes, or only go outside when PM concentrations are predicted to be less severe.⁵ Whether this advice could be effective as a protective measure will depend on whether it is possible for the person to change routes and whether the nature of the APD sees shifting or stable levels of PM.

A further possible intervention is the use of facemasks. There are many factors that will affect the determination of whether or not to provide facemasks for community use during APDs, including concerns about whether there are other more effective mechanisms that may protect people, effectiveness and efficacy of

the masks, risk/benefit assessments, ethical considerations,⁶ cost, and potential liability.

In some cases, public health interventions have been deemed to have such significant safety benefits on aggregate that legislation has been passed to make the adoption of these interventions mandatory, for example, seat belts. In the absence of such legislation, it is important to consider other sources of law, which may or may not impose a legal duty on an identifiable agency to provide facemasks during an APD. It is also important to consider any legal risks or requirements if a decision is made to provide facemasks during an APD. There has been no analysis of potential legal issues arising out of negligence law, as it emerged from the common-law context,^a in APDs. This paper first analyzes whether agencies may have a legal duty of care to provide warnings about the health risks associated with APDs and/or to provide facemasks for community use as a protective measure. The paper then examines the potential for liability if a decision is made by an agency to issue facemasks for community use during an APD and persons claim that they sustained a personal injury as a consequence. It does not analyze any legal responsibilities that may arise between an employer and an employee in an employment law context, as this may be determined by workplace safety legislation in that jurisdiction, which creates specific duties of care.

PARTICULATE AIR POLLUTION AND HEALTH

Short- and long-term exposures to ambient PM_{2.5} (PM sub-2.5 µm in diameter) can negatively impact both morbidity and mortality.⁷ It is currently thought that there is no safe threshold below which effects would not occur.⁸ A meta-analysis of air pollution studies calculated that there is a 6.2% increased risk of mortality for every 10 µg/m³ increase in annual average PM_{2.5} concentrations.⁹ PM is also classified by the International Agency for Research on Cancer as a carcinogen.¹⁰ Different particle types will have different toxicities, based upon their compositions, sizes, and sources, but there is currently insufficient evidence to differentiate these in non-occupational settings.⁷ The risk also depends upon socioeconomic factors, genetic susceptibilities, and individual exposure levels, so the specific risk of inhaling PM in any given APD is almost impossible to define at the time of individual or community exposures. There may also be non-particulate pollutants, such as gases, which may have separate toxic effects and may require different exposure reduction measures.

FACEMASKS

Outside of occupational settings, few studies have researched the efficacy of various types of respiratory protection, from cloth materials (eg, bandanas) to surgical masks and industrial protection, as a preventive measure against the inhalation of PM when used in a community setting.¹¹⁻¹⁵ The evidence

from laboratory-based research suggests that different forms of respiratory protection offer substantially varying levels of protection based on (1) the effectiveness of the material at filtering particles, (2) the size and possibly composition of the particulates, and (3) the fit to the face (ie, leaks around the edges). For example, Mueller et al.¹³ and Steinle et al.¹⁵ found that cloth materials were ineffective at filtering volcanic ash particles, whereas some surgical masks and industry-certified facemasks have the potential to be highly effective, if a good fit to the face can be achieved. The evidence also indicates that some facemasks are perceived by those who wear them as being more wearable than others, therefore likely affecting uptake.^{15,16}

LEGAL ISSUES

The liability concerns primarily relate to whether an individual or group could bring a claim of negligence against an agency that did or did not provide them with an intervention, warning, or advice. While the specific rules differ among jurisdictions, in general, to bring a successful negligence action, at least under the common-law, a plaintiff needs to establish that (1) the defendant owed them a duty of care, (2) a breach of the duty has occurred due to a failure to meet the expected standard of care, and (3) damage recognized by law (eg, physical injury) has occurred, which is a reasonably foreseeable consequence of the breach and that the breach of the duty caused the damage.

The first question explored in this section is whether there could be a duty of care owed by agencies to members of the public arising from the law of negligence in an APD. This could consist of a duty of care that requires that agency to provide facemasks for community use during an APD. Or it could consist of a duty to provide a warning about the potential risks associated with an APD and possible interventions so that individuals can choose whether and how they will manage that risk. The second question considered in this section is if an agency makes a decision to provide facemasks during an APD, what may be the consequences if a person alleged that the agency had been negligent in how it provided the masks. An agency could be public (government) or non-governmental (for-profit or not-for-profit). Non-governmental agencies have been involved in the provision of facemasks during volcanic eruptions and similar events, as a result of donations by facemask companies or through crowdfunding.¹⁷

Could There Be a Duty of Care Requiring the Provision of Facemasks and/or a Warning?

There are established categories where a duty of care is owed. For example, it is settled that a doctor owes a duty of care to a patient. In some circumstances, a government agency may be held to owe a duty of care to citizens, but the extent of this, in the absence of a clear legislative statement of specific responsibility, is open to question. This would need to be

^aThe common-law emerged from Britain and is the basis for the legal systems in many countries that Britain colonized

determined based on the specific circumstances of that case. A non-governmental agency will also hold a duty of care to those it provides services to, but it may be more difficult to infer a more general duty to the public, as that agency's role and functions are likely to be different from governmental agencies and are assumed voluntarily.

There is some case law in relation to the provision of facemasks and/or warning during an APD. Over 11 000 claimants filed negligence proceedings in respect to exposure to poor air quality for a period of time after the events of 9/11.¹⁸ In many of these cases, the legal actions were brought by persons employed to work on the site. They claimed that a duty of care arose out of employment law. Employment law creates a duty of care requiring employers to take positive action, including the provision of protective equipment, to ensure a safe workplace.¹⁹

Legal actions were also brought by those who were not employees and who lived or worked in the affected area against the head of the US Environmental Protection Agency (EPA), a federal public agency. These actions alleged misleading communications from the EPA, immediately post-9/11. Specifically, that the EPA stated that members of the public living or working close to, or downwind, of the site did not need to be concerned about air quality and, thus, the EPA was alleged to have misrepresented the risks. The US Court of Appeals, 2nd circuit, ruled that the head of the EPA, as a federal official who did not intend to cause harm, had immunity in respect of these proceedings under the qualified immunity doctrine.¹⁹ Not all countries have an immunity doctrine *per se*, and it will not always apply,^{18,20} so it is worth considering the general principles that may determine whether a person or agency has a duty of care.

Duty to Warn/Duty to Provide

It is generally accepted that government agencies have positive, at least moral, duties to protect their citizens from disasters, both prospectively and post-event. However, there is an open question about whether this moral responsibility could constitute a legal duty and, if it could, what the extent of that duty would be.²¹ The fact that a government agency is operating within a statutory framework that aims to, in general terms, protect the public, and if that agency took action it could prevent or minimize the harm, is not sufficient, in and of itself, to give rise to a duty of care.²² Non-governmental agencies, in contrast, generally are not operating under a legislative mandate and have voluntarily assumed or may assume protective responsibilities in respect to identified groups under their own mandate.

The test to determine whether there is a duty of care differs from jurisdiction to jurisdiction and its application is context-specific. Some of the factors that courts may consider in a disaster context may include the following:

1. Are potential claimants or defendants too indeterminate or not sufficiently identifiable?
2. Does the agency control or manage the hazard?
3. Has the agency assumed responsibility?
4. Does the agency know about the risks, have the power to intervene, and are individuals vulnerable as they cannot know of the risk, understand it, or take steps to protect themselves from the risk?
5. Did the agency know, or should it have known, that its acts or omissions to act could affect the risk?
6. Would finding a duty undermine existing legal rules/duties or be consistent with them?
7. Is it fair, just, and reasonable that 1 party should owe a duty of care to the other?

These are complex questions. Those directly affected by a disaster are usually able to be determined, in APDs, based on the affected persons being residents or working in an area where air quality is negatively affected. This could be a large group in a densely populated area.

A duty to warn and what that duty requires was at the heart of the issue when New York residents brought proceedings against the EPA.¹⁹ In some circumstances, the legislative framework within which that agency operates may give rise to an explicit duty to warn. More implicitly, in general, government agencies with remits that encompass disasters do control information that emerges from the management of a disaster^{23,24} and are expected to provide such information to the public. Those agencies know, or should know, that official statements have the potential to change behavior.^{23,24} They are also in a better position to assess and interpret risk than a layperson, assuming this process is not affected by political concerns,²⁴ and to interpret the evidence in relation to possible interventions. In a disaster context, there is an emerging acceptance of a duty on government agencies to warn of disasters and their implications for life, health, and welfare in international law,²⁰ and from human rights law, especially in Europe.²⁵ Thus, accepting a duty to warn of risks associated with an APD may be consistent with other areas of law. These factors may not apply in the same way to non-government agencies, as it is less likely that a non-governmental agency would be considered to control or manage the hazard – nor would such an agency be likely to have the power to intervene in a meaningful way in an APD.

The issue is much more problematic in respect to the question of whether it is fair and just to impose a legal duty on government agencies to provide facemasks. Many legal systems will show some deference to decisions made within the ambit of the decision-making discretion conferred on the agency by legislation. They will also defer to the policy or resource allocation decisions of government agencies.^{19,26} This is on the basis that not every decision made by a government agency should be subject to judicial oversight. Government agencies are often addressing broad social or economic concerns that form part of democratic governance processes and relate to

the separation of powers between the courts, the legislature, and the executive. A decision whether or not to provide a facemask could very easily be characterized as a discretionary, policy, or resource allocation decision²⁶ and so it could be concluded that there was or should be no duty of care. This does not apply to non-government agencies but, generally, it would be difficult to impose a legal duty to provide facemasks. This would recognize the less formal nature of the relationship that the agency has with the community and policy reasons not to impose greater burdens on humanitarian or charitable groups so as to discourage their operations.

In summary, it is possible that there could be a legal duty imposed upon government agencies to provide warnings to the public about the risks and possible interventions associated with APDs so individuals could choose to take precautions. It is less likely that a duty of care to provide facemasks would be imposed, as the courts would be likely to defer to a government agency's policy and resource allocation decisions, particularly in the context of an evolving disaster. It would seem unlikely that a duty to warn or provide would be imposed on a non-governmental agency. It is important to note that this will be determined by the specific legal framework in each country and the specific context of each disaster.

LEGAL IMPLICATIONS IF A DECISION IS MADE TO PROVIDE FACEMASKS

If agencies (government or non-governmental for-profit or not-for-profit) choose to distribute facemasks for community use in an APD, they assume responsibility for that decision and will owe a duty of care to those who receive the product. In a negligence action, a plaintiff could allege that an agency's actions in distributing facemasks had caused harm to that person and could seek compensation. Often, the courts are disposed to be more flexible about negligence claims in a disaster context, acknowledging the inherent difficulties that agencies operate under during a crisis; however, as the crisis ebbs, there is more capacity to act.²³

If the mask, itself, failed (ie, its construction, materials, or filtration), this would be a claim against the manufacturer under product liability law, unless the agency provided masks outside of the use-by date, if there was one. Claims against manufacturers and distributors could overlap. Other grounds for a claim are discussed below.

Standard of Care Choice of Mask

As discussed previously, in a number of countries, the courts will show deference to discretionary, policy, or resource allocation decisions made by government agencies, including why one type of mask was preferred for distribution over another. Non-governmental agencies are not protected in the same way and would need to justify their choice by

reference to evidence, availability (in terms of both logistics and costs of the masks given the available budgets), and a reasonable risk/benefit assessment process.^{6,23}

Informed Consent and Provision of Information

An agency would be distributing facemasks as a public health intervention to address the risks to health associated with an APD. In the health context, devices may be distributed for preventive or treatment purposes but require, in all but very serious emergencies, the informed consent of the end-user or the person authorized to make decisions for that end-user.²⁷ If masks are considered a health intervention, it would seem likely that this law may apply, although how it does may be mediated by the disaster context. The precise test for informed consent, as to what type of information must be provided and in what way, differs in each jurisdiction. Generally, the doctrine of informed consent requires a disclosure of material or relevant risks in relation to the condition and the possible intervention(s), including the burdens, risks, and benefits of all options.²⁷ There are uncertainties, as discussed previously, about the nature of the risk and the limited evidence about the effectiveness of interventions for community use. Given this, the standard of care would likely require the provision of information about the following:

1. What is known and what is not known about the risks of exposure in the particular circumstances
2. The options to reduce exposure, including staying indoors with doors and windows closed or wearing a facemask
3. What is known and not known about how effective the particular mask may be in relation to the person (eg, little evidence about efficacy for children)
4. How, at best, a mask may reduce exposure but will not completely eliminate it
5. How to wear a mask to best maximize any protective effect
6. How a disposable mask will clog or degrade rendering it eventually ineffective, so replacement will be required if exposure is prolonged
7. A close-fitting mask (ie, an industrial N95 style mask) may pose additional risks for people with respiratory or cardiac conditions or claustrophobia.^{5,15,16}

Such information is already available for some types of exposures, such as to volcanic ash.²⁸ The information needs to be evidence-based so that potential users are not misled about the level of protection that a facemask can or cannot provide. If they, in reliance to such advice, increase their exposure thinking that the mask will offer complete protection, and then sustain harm, they could bring a legal case on this ground.

The importance of effective instruction about fit was an issue in the claims brought by some 9/11 claimants, although this was in an employment context.¹⁸ Occupational health and safety law in some countries requires people working in dusty industries to wear a facemask. The mask must be individually fit tested, and training must be provided on how to wear the

mask to maximize its protection.^{5,29} Although a mask may still offer some protection even if the person does not know how to wear it, it will offer more protection if worn correctly.^{11,15} The occupational standards in respect to fit could be argued, at least in part, to establish the standard of care for community use. In an APD community context, individual fit testing is impracticable given the likely scale and scope. However, provision of fit instructions is both practicable²⁸ and important to ensure that protective effects of facemasks are maximized and would likely constitute the expected standard of care.

Damage, Foreseeability, and Causation

To bring a successful case, a plaintiff must prove that the breach of the standard of care caused the damage. The plaintiff could allege that a physical injury, such as a respiratory condition, resulted from not being provided with a facemask, being provided with a facemask that was ineffective, or a facemask that had been issued to that person for their protection without instructions for proper use. This would be difficult to establish for 4 reasons. First, in the case of immediate physical injury (eg, a respiratory condition), it may be difficult to establish whether it was caused by the mask being defective, of poor quality/fit, or the insufficiency of the instructions provided when it was distributed, given that facemasks may reduce but not completely eliminate exposure. It may also be difficult to determine whether the harm occurred prior to mask use. Second, unless the harm was immediate, any impact from exposure would likely be in the longer term. There have been a number of cases alleging harm from exposure to environmental pollutants that have found that it is often difficult to establish that a past event caused a current harm.^{18,30,31} Third, many people globally are exposed to high levels of PM in breach of air quality standards in that country, and some countries have lax air quality standards, well above the WHO air quality guidelines.⁴ It would be difficult to establish that the exposure during the APD (whether or not a mask was worn) caused the harm, as opposed to day-to-day exposure. Fourth, there is a natural incidence of disease types associated with exposures to pollutants. It is difficult to establish, therefore, whether the APD caused the disease or whether that person would have developed it anyway, irrespective of exposure.^{18,32} The case could be further complicated by allegations that the plaintiff's actions had contributed to the damage. For example, if the person had chosen to only partially adopt advice about how to wear the mask and whether to adopt other precautionary measures, this could constitute a partial defense.

DISCUSSION

Given the increasing incidence and severity of APDs, it is timely to examine legal questions around some of the possible interventions. Agencies may be reluctant to recommend or distribute facemasks for community use during such disasters for a variety of reasons, including concerns about liability. This paper examines questions of whether, under negligence

law, there could be a legal duty imposed upon agencies to warn about the risks of an APD to human health and/or a duty to provide facemasks for community use in APDs. It also examines the potential for liability if facemasks are distributed or recommended by an agency during an APD. There are limitations to this analysis, as specific rules in respect to the elements of a negligence action will differ among jurisdictions.

In respect to the first question, it is arguable that, depending on the circumstances, a court might find that a government agency has a duty to warn during an APD, unless there is a compelling reason why state immunity or policy or resource issues mitigate against it. Given warnings are relatively inexpensive and are consistent with other areas of law, if the government is in a position to provide a warning and the risk to human health/life is prolonged, it would seem unlikely that the court would accept a resources defense. However, there would be an expectation that communication would be truthful and evidence informed, acknowledging that evidence might be incomplete at the time of communication.

It is very likely that a decision to whether or not provide facemasks for community use in an APD by a government agency could be characterized as a discretionary, policy, or resourcing decision and thus no duty to provide could be established. It seems unlikely that a non-governmental agency would be found to have a duty to provide or to warn. This will very much depend on the facts of each disaster and the specific rules around negligence and the legislative frameworks in each jurisdiction.

In respect to the second question, regarding the potential for liability if facemasks are distributed or recommended by an agency during an APD, courts generally acknowledge that decisions may be affected by the fast-moving and evolving context of a specific disaster when examining whether there has been negligence. In a disaster context, an agency may be responding to an unexpected emergency, such as a large volcanic eruption or a terrorist attack on buildings, or an expected issue, such as seasonal wildfires. However, if the disaster is not completely unexpected and there has been prior planning as to whether facemasks and what type would be distributed, the courts are likely to be less flexible about the standard of care. In an unexpected emergency, any available mask may need to be used, but, in a predicted emergency, the choice of masks may be affected by questions of efficacy, availability, wearability, and budget. Government agencies could argue resource constraints, whereas other agencies will need to demonstrate a defensible rationale for their choice of mask. If agencies are likely to distribute masks during APDs, then consideration of how to meet the expected standard of care would be essential and should be a part of pre-disaster planning. This could include preparing to provide sufficient information to the public about what is known and not known about the nature of the risk and the limitations of the intervention, the advantages and disadvantages of different types of masks, and how to fit them to the face to maximize protection.

One of the major challenges for anyone bringing a legal proceeding against an agency for harms alleged to have occurred as the result of a facemask being provided or a warning not being provided may be the issue of causation. Causation could be difficult for many plaintiffs to establish, especially in circumstances when the physical injury occurs sometime after the exposure or in environments with high ambient concentrations of air pollution. Given the difficulties with causation and, for government agencies, the discretion afforded to their decision-making, liability may be difficult to establish and thus concerns about legal risks appear to be manageable with appropriate planning.

CONCLUSION

Further research is necessary to determine how the negligence framework may work in each jurisdiction. Also, a legal duty to provide warnings about the health risks associated with APDs and to recommend facemasks as a protective mechanism for community use to reduce exposure to PM may arise in other areas of law, and this should be researched further.

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